

# The Relationship of Personality-Based Learning Style Preferences and Learning among Online Graduate Students

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## ABSTRACT

THE PURPOSE OF THIS STUDY was to examine the relationship of personality-based learning styles and learning among graduate students enrolled in an online doctoral program that utilized the Blackboard<sup>SM</sup> e-learning system. Two measures of learning—course grades and perceived learning—were used. According to the Myers-Briggs Type Indicator®, the majority of students in the sample ( $N = 64$ ) were extraverts, intuitives, feelers and judgers. This profile differed from that of the general population on two personality dimensions: sensing-intuition and judging-perceiving. The general population tends to be sensors rather than intuitives and to be equally distributed between judgers and perceivers. No significant differences in learning were found based on learning styles. The implication for practice is that an online course can achieve equity in learning for all personality-based learning styles provided the course is designed to include elements that appeal to students with different styles. However, what is not known are the roles of motivation to learn and volition for students to persist despite any incongruence between individual learning style and the course as presented. (*Keywords: learning styles, learning, personality, distance education, higher education*)

## INTRODUCTION

**I**NDIVIDUAL DIFFERENCES are as diverse as people themselves. One such area that has drawn much attention in higher education is that of individual learning styles. Defined by James and Gardner (1995), learning style is the “complex manner in which, and conditions under which, learners most efficiently and most effectively perceive, process, store, and recall what they are attempting to learn” (p. 20).

Many studies have measured and explained learning styles (e.g., Gee, 1990; Witkin & Goodenough, 1981) and one common theme has emerged: not all students learn in the same manner. Kolb (1984) further asserted that learning environments that substantially differ from a person’s preferred style of learning are likely to be rejected or resisted by that person. For distance education, the implication is that the medium used to deliver courses at a distance, the design of these courses, and the instructional methods used by the online instructors should accommodate these differences.

Research suggests that learning style is an important factor related to a variety of educational outcomes. Much of this research, particularly in distance education, has focused on an analysis of relationships between learning styles and specific student outcomes and a comparison of these outcomes between distance education and traditional academic environments. These studies have yielded mixed results.

Gee (1990) studied the influence of student learning style preferences on learning and attitudes about learning in a distance education course. She found that successful distance education students tended to favor an independent learning environment while successful on-campus students showed a preference for working with others. Hsu, Frederick, and Chung (1994) also found a significant relationship between cognitive learning styles and academic outcomes. Brenner (1997), on the other hand, concluded that learning style did not impact community college student success in online distance education.

Aragon, Johnson, and Shaik (2000) supported this finding when they found no differences between learning style and course grades among adult students in an online technology education course. Gordon (1995), acknowledging the mixed results of past research, suggested the need to identify the learning style preferences of distance education students and the relationship of these preferences to learning.

## LEARNING STYLES

Learning styles can be classified and defined along a variety of dimensions. James and Gardner (1995) suggested perceptual, cognitive, and affective dimensions, while others have suggested personality, information processing, social interaction, and instructional preference models. Still other researchers have suggested learning style models based on physical and sensory preferences. These theories represent various ways of conceptualizing learning style preferences and none claim to represent the singular way of doing so. Regardless of the conceptualization of learning styles used, Cronbach and Snow (1977) suggested that students tend to reach higher levels of achievement when they are taught in ways that are compatible with their preferred learning style.

The Jungian/Myers-Briggs personality dimensions, largely based on Carl Jung's theory of psychological types, can be used for learning style assessment. According to Myers, McCaulley, Quenk, and Hammer (1998), Jung theorized that everyone has a basic orientation to the world that suggests the directions in which energies or interests flow: to the external world of people and events (extravert or E) or to the inner world of ideas (introvert or I). Each personality type processes information either through immediate and practical experiences (sensing or S) or through inspiration and imagination (intuition or N) and makes decisions on the basis of this information either by logical, impersonal analysis (thinking or T), or on the basis of personal, subjective values (feeling or F). To these three Jungian pairs, Katherine Briggs added a fourth: a judging or perceiving dimension (Myers, 1990). Judgers (J) adapt and relate to their outer world by leading a more structured, planned, ordered existence; making lists;

trying to control events; and needing closure, completion, and decision. Perceivers (P), on the other hand, are more spontaneous and value flexibility.

In summary, the four Jungian/Myers-Briggs personality dimensions describe a person in terms of four sets of dichotomous traits: EI, which addresses whether the individual prefers interaction with others or prefers to work alone; SN, which describes whether the person thinks in the concrete or the abstract; TF, which addresses whether the individual arrives at conclusions through logic or subjectivity; and JP, which describes whether the person's primary orientation is planned and structured or spontaneous and adaptive.

Combining the personality dimensions indicating the preferred style of processing information (i.e., SN) and the preferred decision making style (i.e., TF) render four functions particularly associated with the way that people learn (ST, SF, NT, and NF). Two characteristics depict the ST learner: he or she prefers to learn by doing and is mainly interested in the facts (Myers, 1998). Impersonal decisions are made based on these facts and he or she prefers to use a "step-by-step process of reasoning from cause to effect, from premise to conclusion" (McCaulley & Natter, 1996, p. 21). The SF learner, like the ST learner, prefers doing and also displays an interest in learning practical subject matter; however, this learner approaches the facts by applying personal warmth and concern for others. Also in contrast to the matter-of-fact manner of the ST learner, the SF student prefers a sociable and friendly learning environment. The NT learner prefers to explore the possibilities rather than sticking to the facts. Because this learner prefers thinking, these possibilities are still approached with an impersonal analysis, while the NF learner approaches these possibilities with personal warmth, enthusiasm, and insight (Myers, 1998).

Type theory suggests that children are born with a predisposed preference for some types over others (Myers et al., 1998). Rasmussen and Davidson-Shivers (1998) wrote, "scholars agree that learning styles are relatively stable traits and suggest that learning styles tend to be consistent across different contents and situations" (p. 293). Such a

view suggests that learning styles remain fixed, regardless of whether a student is in a traditional or virtual classroom environment.

Herbster, Price, and Johnson (1996) conducted research to identify patterns of personality types and learning styles among college students. They reported that the Myers-Briggs profile for the majority of these students, who were mostly teacher education majors, was ISTJ. This differs from the larger teacher population identified by Myers and McCaulley (1985), which noted slightly more extraverts and sensors with a predominance of FJs.

In a study of psychological type and learning in distance education courses, Atman (1988) reported that extraverts, intuitives, thinkers, and judgers tended to have the most academic success. Keirsey (1998) suggested that since judging students prefer strong organization and routines, a characteristic of most schools, they are often high achievers in a school setting, whereas perceiving students, who do not like strong structures, usually do not achieve as well in a traditional classroom setting.

Hiltz and Wellman (1997) reported that student grades represent the most prevalent measures of student learning outcomes used by educational researchers. However, the use of grades to operationalize learning may not always provide the best results because grades can have little relationship to what is learned. Students may already know the material when they enroll or the course may be structured so that grades are more related to class participation, timeliness of work, or attendance than to learning. Therefore, solely using grades as a measure of cognitive learning can introduce significant measurement error.

Research suggests self-reports can be a valid measure of student learning. Corrallo (1994) noted that there is a considerable amount of literature concerned with establishing the validity of student self-reports of cognitive outcomes and the consistency of results over time and across different populations. He concluded that self-reports of cognitive gain are indicative of results obtained through more direct forms of assessment.

## PURPOSE

The purpose of this study was to examine the relationship of personality-based learning styles and learning among online graduate students. Both final course grades and self-reports of learning were used to operationalize learning. To guide this study, the following two research questions were investigated:

1. How can graduate students enrolled in an online program be described in regard to Jungian/Myers-Briggs personality types and personality-based learning styles?
  2. Is there a difference in a linear combination of final course grades and perceived learning for students enrolled in an online program based on their personality types and personality-based learning styles?
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## METHODOLOGY

### PARTICIPANTS

THE STUDY CONSISTED of 64 doctoral students enrolled in an online Doctor of Education (EdD) program. The volunteer rate for this study was 93.10%. The sample consisted of 53 (82.8%) females and 11 (17.2%) males. A total of 48 (75.0%) participants were white, 15 (23.4%) were African-American, and 1 (1.6%) was Asian. The mean age of participants was 42.53 ( $SD = 7.93$ ). All participants were employed in the field of education as either a teacher or administrator with the majority working in the K-12 school environment.

### SETTING

Three sections—with 21, 19, and 24 participants respectively—of an online doctoral course in educational research design were sampled in the present study. The goals of this course were for students to develop: (a) an appreciation for the usefulness of research in studying social phenomena; (b) a sophisticated understanding of

quantitative and qualitative research; and (c) the skills necessary to plan, conduct, and critique educational research.

The course was delivered through an accredited inter-denominational Christian university in the Commonwealth of Virginia. Sections were one semester (i.e., 16-weeks) in duration and were taught by the same professor over a two-year period entirely via the Internet using the Blackboard<sup>SM</sup> e-learning system. Each week students were presented with two or three instructional tasks: (a) reading assignments in the course textbook and Web-based professor's notes; (b) an online discussion assignment using group discussion boards; and (c) the evaluation of a case study requiring individual work.

## INSTRUMENTATION

The Myers Briggs Type Indicator (MBTI), Form M (Myers et al., 1998), was used to evaluate the personality dimension profiles of study participants. The MBTI is a 93-item forced-choice questionnaire designed to elicit an individual's preference on four dichotomous personality types. The MBTI has been described and validated through decades of research. Split half reliability coefficients vary between .80 and .92 across all four types for groups aged 15 through 60 plus years (Myers et al., 1998). Correlations of continuous scores from ten studies with intervals from four to five weeks produced reliability coefficients of .77 to .93 for EI, .78 to .92 for SN, .56 to .91 for TF, and .63 to .89 for JP.

Learning in the present study was operationalized by the total points earned in the sampled course and by student perceptions of learning. The total possible course points were 100. Out of this total, 10% of the points were based on the quantity and quality of participation in online course discussions. The remaining points were based on nine written assignments. Perceived learning was measured by the perceived learning instrument, which has been used in many studies related to learning (McCroskey, Sallinen, Fayer, Richmond, & Barraclough, 1996). Participants were asked to respond to the following item: "On a scale of 0 to 9, how much did you learn in this course, with 0 meaning you learned nothing and 9 meaning you learned

more than in any other course you've had?" McCroskey et al. (1996) reported that test-retest reliability over a five-day period was .85 in a study of 162 adult learners.

## **PROCEDURES**

The MBTI was administered to students during a four-day summer residency. The perceived learning measure was made available to participants via an online survey during the final three weeks of the semester to enable them to have substantial exposure to their respective classes. Total course points were obtained at the end of the semester when course grades were calculated and reported. Participants did not know their final course grade when they completed the perceived learning measure.

## **DESIGN AND DATA ANALYSIS**

A causal-comparative design was used for the present study. Two multivariate analyses of variance (MANOVA) were conducted in order to determine if differences in learning existed by personality types and personality-based learning styles. For the first analysis, a four-way MANOVA was conducted using the Jungian/Myers-Briggs personality dimensions as the independent variables (i.e., EI, SN, TF, JP), with the polar ends of each dimension representing the two levels of each variable. For the second analysis, a one-way MANOVA was conducted using the personality-based learning styles (i.e., ST, SF, NT, and NF) as the single independent variable with each learning style representing a different level of the variable. The two dependent variables for both analyses were course grades and perceived learning. Detailed procedures used in the data analyses are described in the following section.



## RESULTS

### PERSONALITY TYPES

THE PERCENTAGES of participants and descriptive statistics for perceived learning and course grade by personality types are displayed in Table 1. The TF dimension was normed differently for females and males in the general population. Among females, 60% are feelers and 40% are thinkers while the male norms are reversed, 40% are feelers and 60% are thinkers (McCaulley, Macdaid, & Kainz, 1985). In the present sample, 64.2% of females were feelers and 35.8% were thinkers, whereas 18.2% of males were feelers and 81.8% were thinkers.

The percentages of participants by type in the sample were consistent with those of the general population for the EI and TF dimensions. However, the sample differed significantly from that of the general population for the SN,  $\chi^2(1, N = 64) = 32.19, p < .001$ , and JP,  $\chi^2(1, N = 64) = 25.00, p < .001$ , dimensions. The present sample included significantly more intuitives than sensors and more judgers than perceivers. Overall scores for perceived learning and course grades ranged from 4 to 9 ( $M = 7.09, SD = .99$ ) and from 65.20 to 97.70 ( $M = 88.42, SD = 5.74$ ), respectively.

A four-way MANOVA was conducted to determine the effects of the four personality dimensions on the two dependent variables. Use of MANOVA requires that the dependent variables be related. In this study both variables are conceptually related in that they are both measures of the learning construct. However, the two variables in the present study were not statistically related,  $r = .21, p = .09$ .

The results of Box's  $M$  test,  $F(21, 415) = 1.88, p = .01$ , provided evidence that the observed covariance matrices of the dependent variables were not equal across groups, a violation of the MANOVA assumption of homoscedasticity. However, the results of Levene's test for perceived learning,  $F(11, 52) = .87, p = .57$ , and course grades,  $F(11, 52) = 1.99, p = .06$ , provided evidence that the error variance of each dependent variable was equal across groups. The MANOVA results, using Pillai's Trace as the criterion, which is a robust criterion when

**Table 1.**  
**Percentages of Participants, Perceived Learning and Course Grades by**  
**Personality Types (N=64)**

|   | <u>Percentages</u> |                   | <u>Perceived</u> |           | <u>Course</u> |           |
|---|--------------------|-------------------|------------------|-----------|---------------|-----------|
|   | <u>This</u>        | <u>General</u>    | <u>Learning</u>  |           | <u>Grades</u> |           |
|   | <u>Sample</u>      | <u>Population</u> | <i>M</i>         | <i>SD</i> | <i>M</i>      | <i>SD</i> |
| E | 67.19%             | 70%               | 7.28             | 1.01      | 88.67         | 6.59      |
| I | 32.81%             | 30%               | 6.71             | .85       | 87.91         | 3.52      |
| S | 37.50%             | 70%               | 6.71             | .91       | 88.22         | 4.24      |
| N | 62.50%             | 30%               | 7.33             | .97       | 88.55         | 6.53      |
| T | 43.75%             | 40-60%            | 6.93             | 1.12      | 87.85         | 6.33      |
| F | 56.25%             | 40-60%            | 7.22             | .87       | 88.87         | 5.29      |
| J | 81.25%             | 50%               | 7.10             | 1.05      | 88.29         | 5.30      |
| P | 18.75%             | 50%               | 7.08             | .67       | 89.00         | 7.62      |

*Note.* Percentages for the general population are from McCaulley, Macdaid, and Kainz (1985).

homoscedasticity is not tenable, revealed that there were no significant multivariate differences along the EI, SN, TF, and JP dimensions on perceived learning and course grade ( $df = 2, 51$ ;  $F_s = .43, 1.29, .15$ , and  $.16$ , respectively;  $\eta^2_s = .02, .05, .006$ , and  $.006$ , respectively;  $ps > .05$ ).

## PERSONALITY-BASED LEARNING STYLES

The percentages of participants and descriptive statistics for perceived learning and course grade by personality-based learning styles are displayed in Table 2. The percentages of participants by type in the sample were significantly different from that of the general population,  $\chi^2 (3, N = 64) = 43.44, p < .001$ . Overall, the present sample had fewer ST and SF learners and more NT and NF learners.

**Table 2.**  
**Percentages of Participants, Perceived Learning, and Course Grades by**  
**Personality-Based Learning Styles (N=64)**

|    | <u>Percentages</u> |                   | <u>Perceived</u> |           | <u>Course</u> |           |
|----|--------------------|-------------------|------------------|-----------|---------------|-----------|
|    | <u>This</u>        | <u>General</u>    | <u>Learning</u>  |           | <u>Grades</u> |           |
|    | <u>Sample</u>      | <u>Population</u> | <u>M</u>         | <u>SD</u> | <u>M</u>      | <u>SD</u> |
| ST | 23.44%             | 32.50%            | 6.73             | 1.10      | 87.35         | 4.22      |
| SF | 14.06%             | 35.50%            | 6.67             | .50       | 89.66         | 4.10      |
| NT | 20.31%             | 14.50%            | 7.15             | 1.14      | 88.42         | 8.28      |
| NF | 42.19%             | 17.50%            | 7.41             | .89       | 88.61         | 5.68      |

*Note.* Percentages for the general population are from McCaulley, Macdaid, and Kainz (1985).

that there were no significant multivariate differences among the ST, SF, NT, and NF learning styles on perceived learning and course grade,  $F(6, 120) = 1.28$ ,  $p = .27$ ,  $\eta^2 = .06$ .

## DISCUSSION AND CONCLUSIONS

THE PRESENT STUDY provides important information for online institutions by exploring the relationship of personality-based learning style preferences and online learning. The mixed results of previous studies regarding the effects of learning styles on learner success demonstrate a disparity in research and a call for studies such as this one to better understand the learning styles of online students and their effect on learning.

## **PERSONALITY TYPES AND LEARNING STYLES**

The first research question sought to describe graduate students enrolled in an online program in terms of their personality types and personality-based learning styles. According to McCaulley et al. (1985), the majority of the general population consists of extraverts, sensors, and feelers with an equal distribution between judgers and perceivers. In the present study the majority of students were extraverts, intuitives, feelers, and judgers.

This study found that the 64 online graduate students were more extraverted (67%) than introverted (33%), which is consistent with both the general population and with academically successful distance education students (Atman, 1988). There were more abstract-thinking intuitives (62.50%) than concrete-minded sensing types (35.50%), which significantly differed from both the general population (Myers, 1990) and with those in the teaching field (Myers & McCaulley, 1985). However, this SN dimension finding is consistent with that reported by Atman (1988) for high achievers in distance learning. There were also more harmony-seeking feelers (56.25%) than logic-needing thinkers (43.75%) in the present sample, which is similar to that of the general population based on the gender distribution of the present sample (McCaulley et al., 1985), although it differs from Atman's (1988) findings of high achievers in distance learning. Finally, there were substantially more structured, sequentially thinking judgers (81.25%) than the more spontaneous, flexible thinking perceivers (18.75%). Although the JP dimension finding was significantly different from that of the general population, it is consistent with the majority of university students (Herbster et al., 1996), those successful in distance learning environments (Atman, 1988), and those from educational populations (Myers et al., 1998).

Shindler (1998) suggested that many of the qualities of education students often reflect the culture of K-12 schools where most of the participants work or formerly worked. Teachers are often extraverts who prefer to process thoughts externally. They also tend to be sensing individuals who think linearly and are careful about getting the

facts correct although the participants in this study were more creative and abstract individuals, perhaps indicative of their selection of a distance education doctoral program over a traditional one. Teachers are frequently feelers who make caring judgments, attend to interpersonal relationships, and seek harmony. Finally, teachers also tend to be judges who prefer order and structure in the classroom. Accordingly, the personality characteristics of the students in the present sample (i.e., extraverts, intuitives, feelers, and judges) differed only slightly from those with similar occupational backgrounds (extraverts, sensors, feelers, judges) and those attracted to and experiencing success in distance education programs (extraverts, intuitives, thinkers, judges).

The present sample was also significantly different from that of the general population regarding personality-based learning styles. In particular, NF and NT styles were over-represented and ST and SF styles were under-represented. Thus, participants in the present study preferred a logical and analytical approach to learning, were problem-solvers, and tended to value relationships and seek harmony within the online community of learners.

## **EFFECTS ON LEARNING**

The second research question sought to determine if there were differences in the pattern of final course grades and perceived learning based on personality types and personality-based learning styles. Drawing from previous research (e.g., Gee, 1990; Hsu et al., 1994), one could hypothesize the existence of differences in learning by learning style. One would suspect that the use of independent study associated with distance education would appeal to the introvert, but the prospect of studying alone would be less than gratifying for the extravert. However, the online group discussion component would be important in satisfying the extravert's need for interaction. One would also expect the exploration of new content to appeal to the intuitive student, although any rigidity of content would be less than stimulating. The incorporation of graphics in the online instructor notes should be of some interest to sensing students. The strong logic

inherent in a research design course would be far more appealing to thinkers than to feelers; however, the weekly group discussion activities would be particularly suited to feelers who prefer cooperative relationships with others. The strong structure of the course and highly prescriptive coursework should appeal to judges; however, the inflexibility and high structure of the schedule, assignments, and deadlines would be much less appealing to perceivers.

Notwithstanding these differences between learning styles and the course as presented, no significant differences in learning existed based on either personality dimensions or personality-based learning styles in the present study. This finding does not suggest that online courses should not be designed and facilitated with diverse learning styles in mind. In contrast, online teachers should vary their teaching methods and assignments in an effort to achieve equity in learning for all individuals.

The recognition of diversity in personality-based learning styles was purposefully addressed in the design of the online course examined in the present study. Supporting the SF and NF learning styles, the professor implemented a friendly learning environment specifically designing a participation rubric specifying the need for online course discussions to reflect such qualities as sociability, sensitivity, discernment, concern, kindness, and gentleness. The use of precise instructions supported the ST and SF learning styles. Coursework included theoretical constructs, which appealed to the NT and NF learning styles, while most of the individual assignments required students to apply these theories in evaluating case studies, which then appealed to the ST and SF students who need to see the logical and practical reasons for doing something. Thus, the course included elements that should appeal to all personality-based learning styles, but also included features that each learning style would not favor. Study findings suggest that addressing some elements of all learning styles in an online course provides sufficient support for all students to learn. The implication for practice is that an online course can achieve equity in learning for all personality-based learning styles provided the course is designed to include elements that would appeal to each student.

However, what is not known are the roles of motivation to learn and volition (i.e., those thoughts and behaviors that are directed toward maintaining one's intention to attain a specific goal in the face of distractions). Doctoral students are professionals who are generally regarded as possessing a strong motivation to learn. They are highly committed to their work and generally possess a strong record of academic and professional achievement that suggests strong motivation to complete a doctoral program, even in the face of adversity. In the context of the present study, the motivation and volition to learn may have been sufficiently great for study participants to overcome the resistance resulting from incongruence between course characteristics and individual learning styles. Consequently, the finding that personality-based learning styles are not related to learning in an online program may only generalize to doctoral students and to those students with strong motivation and volition.

## **LIMITATIONS AND DELIMITATIONS**

Although the student sample employed in this study is fairly large, it was comprised of education students attending a single course at the same university in the Eastern United States. As such, results may not generalize to education students taking other courses or attending other universities. This study was also limited to the specific variables of personality types, course grades, and perceived learning. Continued study is necessary to determine whether other learning styles make a difference in online learning, such as those related to perceptual, cognitive, and affective models. Additionally, more study with larger and more diverse groups of students is needed to more fully understand the role personality typology plays in the online teaching and learning process. Other criteria of student success, such as student retention or goal attainment should be also explored to provide a broader spectrum of study.

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